DOCUMENT RESUME

ED 026 141 PS 001 534

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Fear and Attachment in Young Children. Research Project Number 4 of Project Head Start Research and Evaluation Center, Syracuse University Research Institute. Final Report, November 1, 1967.

Syracuse Univ., N.Y. Research Inst.
Spons Agency-Office of Economic Opportunity, Washington, D.C.
Report No-OEO-4010
Pub Date 1 Nov 67
Note-18p.
EDRS Price MF-$0.25 HC-$1.00
Descriptors-Behavior Patterns, *Fear, Inhibition, Mothers, Parent Child Relationship, *Parent Influence, *Preschool Children, Psychological Patterns, *Reactive Behavior

The objective of this project was to test the effect of the presence of a mother, compared with the presence of an adult female stranger, upon the apprehensiveness of children confronted with novel stimuli. Subjects were 10 children, 3 1/2 to 5 1/2 years old, who were individually placed in a room containing a toy cash register, a marble-race toy, and a hidden mechanical toy gorilla. Each child was accompanied either by a mother or by an assistant experimenter. Ratings were made of facial expression, movement about the room, and visual orientation over a 5-minute period when the gorilla was animated. It was predicted that behavior would differ between the subjects in a manner suggesting less initial fear and rapid dissipation of fear by those accompanied by a mother. Results were opposite to predictions. The difference in the effects of the presence of an attached individual and an unattached individual are not as marked for children 3 1/2 to 5 1/2 years old as they are for children 9 months to 2 1/2 years old. Since this study is inconclusive, other studies with additional experimental and control groups are planned. (DO)

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Project Head Start Research
and Evaluation Center
Contract # OEO 4010
Final Report
November 1, 1967

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PS001534

Abstract

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Children 3½ to 5½ years old were exposed to a fear stimulus either in the presence of their mothers or in the presence of an adult female stranger in a test of a hypothesis derived from attachment theory. Ratings were made of facial expression, movement about the room, and visual orientation over a 5 minute period. The results failed to support the prediction of less fear in the presence of the mother. At the appearance of the fear stimulus there was no change in facial expression for Ss in the stranger condition, whereas, Ss in the presence of the mother changed facial expressions in the unpleasant direction. Other comparisons, although nonsignificant, were also contrary to prediction. It was suggested that the presence of the stranger inhibited motility and emotional communication.

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Fear and Attachment in Young Children[1]

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The purpose of this study was to test the effect of the presence of an attached individual (the mother), as compared with the presence of an adult female of short acquaintance, upon the apprehensiveness of children when exposed to novel stimuli. The concept of attachment used in this context is synonomous with "specific attachment" as used by Schaffer and Emerson (1964). It is manifested behaviorally by a preference for the proximity of a specific individual and by a protest reaction to separation from the individual. It is also related to the concepts of attachment used by Cairns (1966) and of primary socialization bond used by Scott (1963).

Both Cairns (1966) and Scott (1963) conclude that prolonged exposure to a salient object is crucial for the formation of attachments in mammals. Scott (1963) further theorized that emotional arousal in the presence of a salient object facilitates the precess of attachment formation. In a longitudinal study of the development of attachments in human infants, Schaffer and Emerson (1964) found that the strength of the attachment to the mother at 18 months of age was positively related to the extent of maternal-infant interaction and the responsiveness of the mother to the infant's cry. Since prolonged exposure and emotional arousal are conditions which typically characterize the human maternal-infant relationship, it is not surprising that Schaffer and Emerson found in all sixty of the children in the sample, evidence of a specific attachment to the mother by 18 months of age and in 90% by 11 months of age.

In a recent review of maternal-infant relationships in mammals, King (1966) theorized that the distress which would follow the exposure of a solitary infant to novel stimuli is inhibited in the presence of the mother because of the positive affective state which she evokes in the infant. The work of Harlow and Zimmerman (1959) with rhesus monkeys raised with cloth and/or wire surrogate mothers suggests that a particular type of prior stimulation arising from interaction with the mother object is required in order for her presence to have a distress inhibiting function. It is postulated that without the type or prior experience which results in a specific attachment, the mother's presence will not have a distress inhibiting effect. The importance of attachment related experience is supported by Rheingold's (in press) study which showed that the presence of the mother in a strange room inhibited distress in 10 month old humans whereas the presence of a female adult stranger resulted in a display of distress comparable to being alone. Also, a study of Morgan and Ricciuti (in press) indicated that the approach of a strange adult evoked distress in 12 month old humans who were seated several feet from their mothers; however, this distress was significantly attenuated when the infants were on their mothers' laps. Thus for human infants the proximity of strange adults, rather than inhibiting distress, may be the occasion for the evocation of distress.

Experimental evidence is abundant and consistently in support of maternal inhibition of distress in humans below three years of age (see also Arsenian, 1943, and Ainsworth and Wittig, in press), and clinical evidence (e.g. Freud and Burlingham, 1943) suggests that this effect continues into later childhood. However, there appears to be no experimental evidence for children over three years of age which bears directly upon the existence of a unique role for attached

individuals as inhibitors of distress.

In this study children were exposed to a fear stimulus either in the presence of their mothers or in the presence of an adult female stranger. Ratings were made of their facial expression, movement about the room, and visual orientation over a five minute period. It was predicted that these behavioral indices would differ between the subjects in the two experimental conditions in a manner which would suggest less initial fear and a more rapid dissipation of fear for subjects in the presence of the mother.

Method

Subjects were obtained by writing letters to the parents of children enrolled in a private nursery school near Syracuse University. The letter described the experimental procedure in detail and was followed by a phone call, during which an individual appointment was made. Sixty per cent of the mothers contacted made and kept appointments. Reasonably complete data were obtained for 16 children who ranged in age from 3 years 7 months to 5 years 9 months with a mean age of 4 years 6 months. Their fathers had an average of 16.9 years of education and their mothers had an average of 14.7 years.

Fear stimulus. The fear stimulus was a toy mechanical gorilla 10 inches tall and covered except for the molded plastic face and hands with a gray-black plush fabrick (formerly distributed by Louis Marx Toy Co., Inc., New York City). The gorilla is operated from a remotely situated 3 volt DC power source and current reversing switch. Depending upon the direction of current flow the gorilla will either walk slowly in a straight path or stand still, turn his head from side to side, and beat his chest. These movements are accompanied by the clearly audible sound of the internal motor.

Prior to its exposure the Gorilla was concealed in a black box. The front

side of the box was hinged at the base and held closed by an electro-magnetic catch. (Fig. 2) The wires from the gorilla and the magnetic catch passed out of the rear of the box and to an adjacent observation room.

The test room was 9 by 15 feet with a reflecting one-way vision glass on one of the 9 ft. walls. The box containing the gorilla was placed on the floor below the observation window. To the right of the gorilla box and angled across the corner of the room was a bench containing a toy cash register and a tiered plastic marble race toy. There were two chairs at the opposite end of the testing room, one in each of the corners and equi-distant from the gorilla box. All other items which seemed attractive to children had been removed from this functionally windowless room.

Procedure

The experimental procedure consisted of an adaption phase and a test phase. The adaption phase was the same for all subjects. When subjects arrived for the experiment they were met by the female assistant who told them that Dr. Schwarz was occupied but would be free to talk to the mother shortly. The assistant offered to wait with them in the test room, stating on the way that she know some games to play while they waited. The assistant began the first game by tossing a bean-bag to the mother and encouraging her to toss it to the child. After two minutes of "bean-bag" the assistant initiated "follow-the-leader". After 4 minutes of play the mother took a seat on the right hand side of the room while the assistant administered a picture vocabulary test to the child. Next, at 5 minutes esapsed time, the assistant lead the child to the marble race and cash register which had been covered by a sheet. She demonstrated their operation and encouraged the child to play.

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At this point the experimenter entered and introduced himself to the mother. A flip of a coin had determined the assignment of experimental conditions. If the child were to be in the Mother Condition, the Experimenter asked the assistant to come out of the room, and remarked to the mother that he would see her shortly. For the Assistant Condition the experimenter asked to see the mother and, before leaving, turned to the child and remarked casually that his mother would be back shortly. The assistant took up the mother's position. Both mother and assistant were given a magazine containing instructions to ignore the child and the gorilla, to respond to the child's question with a brief, "I don't know", and if the child persisted to remark, "I have to read this magazine".

The departure of the mother or the assistant marked the beginning of the test phase. Observers behind the one-way glass began recording aspects of the child's behavior and continued for the next 6 minutes. While playing with the toys the child was about 2 ft. from the gorilla box. After 60 seconds of play a switch was thrown in the observation room to start the gorilla beating his chest and turning his head from side to side while in the box. Then the magnetic catch was released causing the front of the box to flop down with a slap which invariably attracted the child's attention. Now the gorilla was exposed to the child's full view. The chest beating was continued for a few more seconds and then the current was reversed, causing the gorilla to walk slowly and ponderously down the ramp. When the gorilla had reached a position about 17 inches from the box, the current was reversed, again causing the gorilla to stop walking and to resume beating its chest and turning its head. After a total of about 25 seconds all action of the gorilla was stopped and it remained stationary for the remainder of the test phase. Observations of the child with the conditions unchanged continued for an additional 4½ minutes.

At the conclusion of the test phase the child was given a chance to operate the gorilla. Any misconceptions of the child were corrected by explanation and demonstration. Each child was brought to the point where he would willingly touch and hold the gorilla before leaving the experiment.

Behavioral observations and ratings

Facial expression. As one method of assessing the degree of apprehension aroused by the gorilla, ratings were made of the child's facial expression. A composite picture was developed which provided photographic examples of children's facial expressions representing seven points on a continuum of pleasure ranging from very unhappy or displeased to very happy. Three or four pictures which had been judged relevant to this dimension and for which the judges' ratings were low in variability exemplified each point on the scale. Every 15 seconds a light flashed in the observation room signalling the moment for a rating. The rater noted the child's expression of the moment, glanced at the pictorial composite, and assigned a number associated with the facial expression most similar to that of the subject at that moment. If the child was facing away from the rater, the rating was skipped. In the analysis of the data ratings were averaged for each minute of the test phase.

Unpleasant facial expressions were assumed to be indicative of fear and apprehension in this situation. Therefore, it was predicted that the facial expressions of Ss in the Assistant Condition would indicate greater displeasure at the exposure of the gorilla and would return to the neutral or pleasurable portion of the scale more slowly than the facial expressions of Ss in the Mother Condition.

Position in the room. The floor surface of the testing room was marked off into 18 inch squares to facilitate recording of the Ss position in the room. With

the flashing of the signal light every 15 seconds in the observation room an observer noted the S's position in the room. From this record it was noted whether the S left the area of the toys and the gorilla and the time at which he returned.

Since the person in the room ignored the S, and since the toys near the gorilla were the only attractive item in the room, it was assumed that the S's distance from the area of the toys and the gorilla would reflect his degree of apprehension or fear of the gorilla. Accordingly, it was predicted that Ss in the Mother Condition would be less likely to leave or would return more rapidly to the area of the toys and the gorilla than Ss in the Assistant Condition.

Visual Orientation. A multiple event recorder was used to record the child's visual orientation. Four categories of response were recorded: looking at the gorilla, at the toys, at the mother or assistant (person), and looking elsewhere about the room. This equipment was not available at the start of the study, therefore records were obtained for only 10 subjects, 5 in each condition. No specific predictions were made for visual orientation.

Results

The data on facial expression for a given S consisted of six scores: the average rating for the first minute of the test phase before the gorilla emerged, and an average rating for each of the five succeeding minutes of exposure to the gorilla. These data were analyzed in a mixed Treatments by Subjects (Lindquist Type I) analysis of variance design. The interaction effect between treatment conditions and trials was statistically significant. ($F = 3.14$, $p < .02$, $df = 5/70$). The trend over trials was not significant, for the assistant Condition, but was significant beyond the .001 level in the Mother Condition ($F = 7.94$, $df=5/35$).

Contrary to prior prediction, children whose mothers were present had a sharp decline in the pleasantness of facial expression as a consequence of exposure to the gorilla, where as the children in the presence of the female assistant showed no significant change in expression. The difference between the means of the two groups was greatest during the first minute of exposure ($t = 2.38$, $p < .05$) and decreased progressively as a result of increases in pleasantness of expression among subjects in the Mother Condition.

The other index of apprehension, time to return to the area of the toys and the gorilla, also yielded differences between the two conditions which were opposite to prior prediction. It took longer for children in the Mother Condition to return to the area of the toys and the gorilla; however, this difference only reached the .10 level of significance with the Kolmogorov-Smirnov two-sample test ($N = 16$).

Significant biserial correlations were found between ratings of facial expression during exposure to the gorilla and whether the child returned or not to the area of the gorilla and the toys by the end of the five minute exposure period (See Table 1). Unpleasant facial expressions during gorilla exposure were associated with failure to return to the toys. Expression prior to gorilla exposure was not significantly related to the child's return to the toys.

Since the number of Ss for whom the visual orientation data was available is small, conclusions which may be drawn from this data are limited. Table 2 presents the mean percentage of total time spent looking at four categories of objects during the 5 minutes of exposure to the gorilla by children in the Mother and Assistant Conditions. The children with their mothers spent more time looking at the gorilla than those with the assistant, however, the Mann-Whitney test of this

difference only reached the .08 level of significance. This surplus time spent looking at the gorilla by the mother group seems to have been taken away from the categories of Toys and Person.

In Figure 2 the mean number of seconds spent looking at the four objects during each minute of the test phase for Ss in the Mother and Assistant Conditions are plotted as a function of time. Analysis of variance (Lindquist Type I) revealed significant main effect for Time for all objects except Person. The experimental treatment effect was not significant for any object nor was the interaction; however, the interaction effect reached the .10 level for Gorilla.

A correlational analysis indicated, in general, that Ss distant from the gorilla had unpleasant facial expressions and spent more time looking around the room and less time looking at the toys than Ss close to the gorilla. But position in the room was not related to the time spent looking at the gorilla. Time spent looking at the gorilla was negatively related to the time spent looking at the toys.

Discussion

It is apparent that most of the results were opposite to what one would expect if the mother had had a greater distress inhibiting effect upon the child than the stranger. Yet it does not seem possible that the mother could have had a fear inducing effect upon the child. Her presence, however, may have facilitated the communication and expression of fear. Being left in a strange room with a strange person may have induced a general inhibition of motility and emotional communication. The assistant may have been an aversive stimulus. Her presence at one end of the room and the appearance of the gorilla at the other, perhaps generated an avoidance-avoidance conflict which was resolved by focusing attention on the toys, the only positively valued stimulus in the room. It may even be

conjectured that the presence of the mother gave children in the Mother Condition sufficient security to cope with the frightening gorilla as manifested by their tendency to spend more time looking at the gorilla.

An alternative explanation involves the assumption that the presence of the assistant continued to evoke in the children a set or expectancy for play and amusement. With this type of psychological set the appearance of the gorilla, an ambiguous as well as a novel stimulus, may have been given a nonthreatening construction which was compatible with that expectation; namely, that the sudden appearance of the gorilla was another game perpetrated by the playful assistant. Some facts are not entirely consistent with this explanation, however. First of all, one would expect Ss in the Assistant Condition to have happier facial expressions in the minute before the appearance of the gorilla, which they did not. Secondly, the Ss in the Assistant Condition, for the most part, did not make playful responses toward the gorilla, but rather seemed to actively ignore it, after initial minute of intense visual inspection.

Since this study is inconclusive with regard to the existence of a greater distress inhibiting function for the mother as compared with a stranger in children from three to five years of age, other studies with additional experimental and control groups are planned. Since no children were exposed to the gorilla while alone, it cannot be concluded that the mother had no distress inhibiting effect. It is clear, however, that the effects of the presence of an attached individual as compared with an unattached individual are not as marked for children from 3½ to 5½ years as they are for children from 9 months to 2½ years.

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Footnotes

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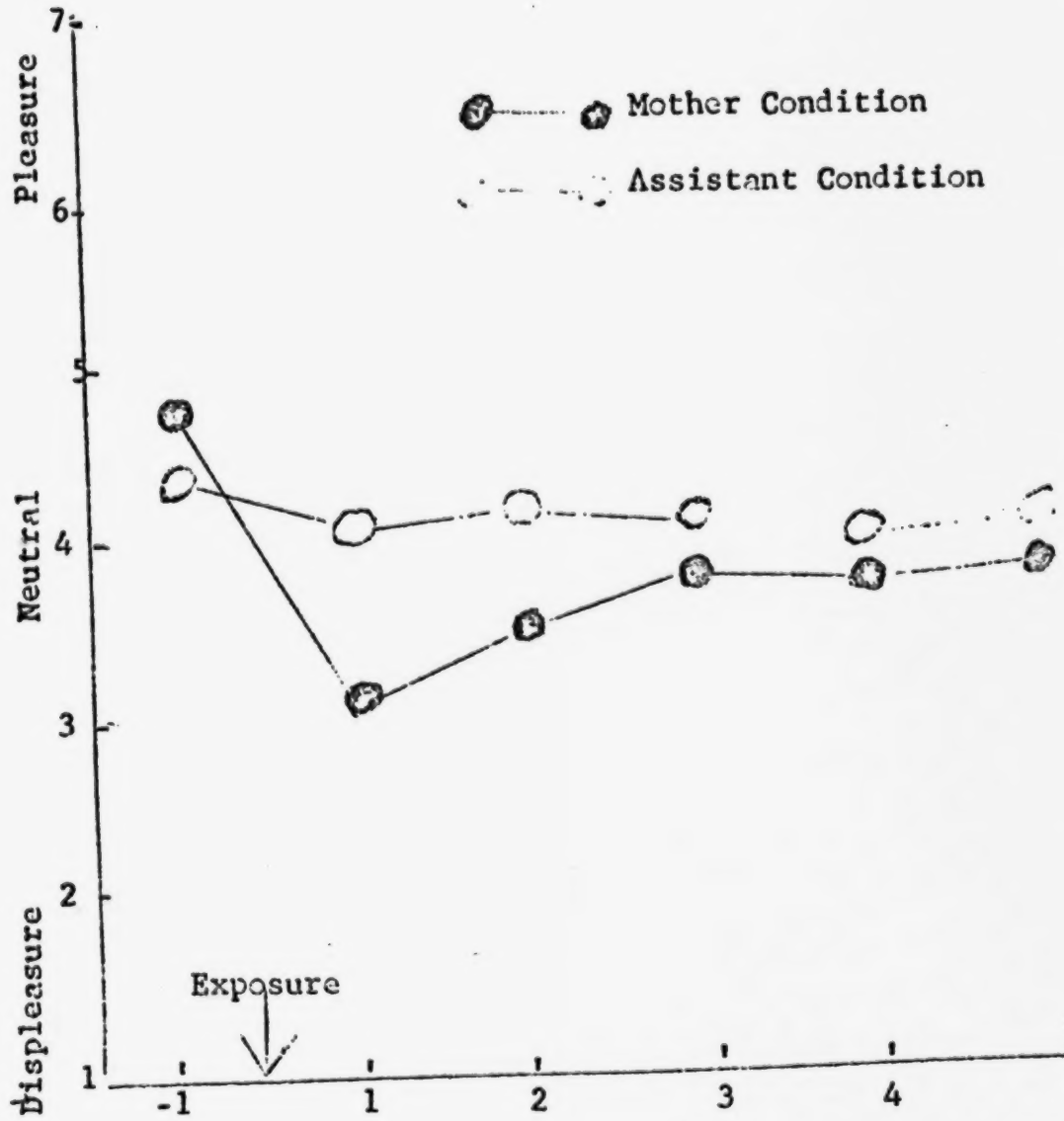
[1]This study was supported by Contract OE04120 United States Office of Economic Opportunity. The author wishes to express his appreciation to Linda L Dafidoff, Irwin L. Keppler, Sandra R. Diener, Cynthia H. Deitch, and Toni G. Hollander for their assistance in the collection analysis of the data. A special notice is due Mrs. Mildred Blackburn, Director of the Erwin Methodist Nursery School for her assistance in locating children for this study.

Figure Captions

Fig. 1. A plot of the means of the Mother and Assistant Conditions for facial expression ratings averaged over one minute periods from one minute prior to gorilla exposure through the fifth post-exposure minute.

Fig. 2. Graphs of the mean number of seconds spent looking at Person, Room, Gorilla, and Toys during each minute of the test phase for Ss in the Mother and Assistant Conditions.



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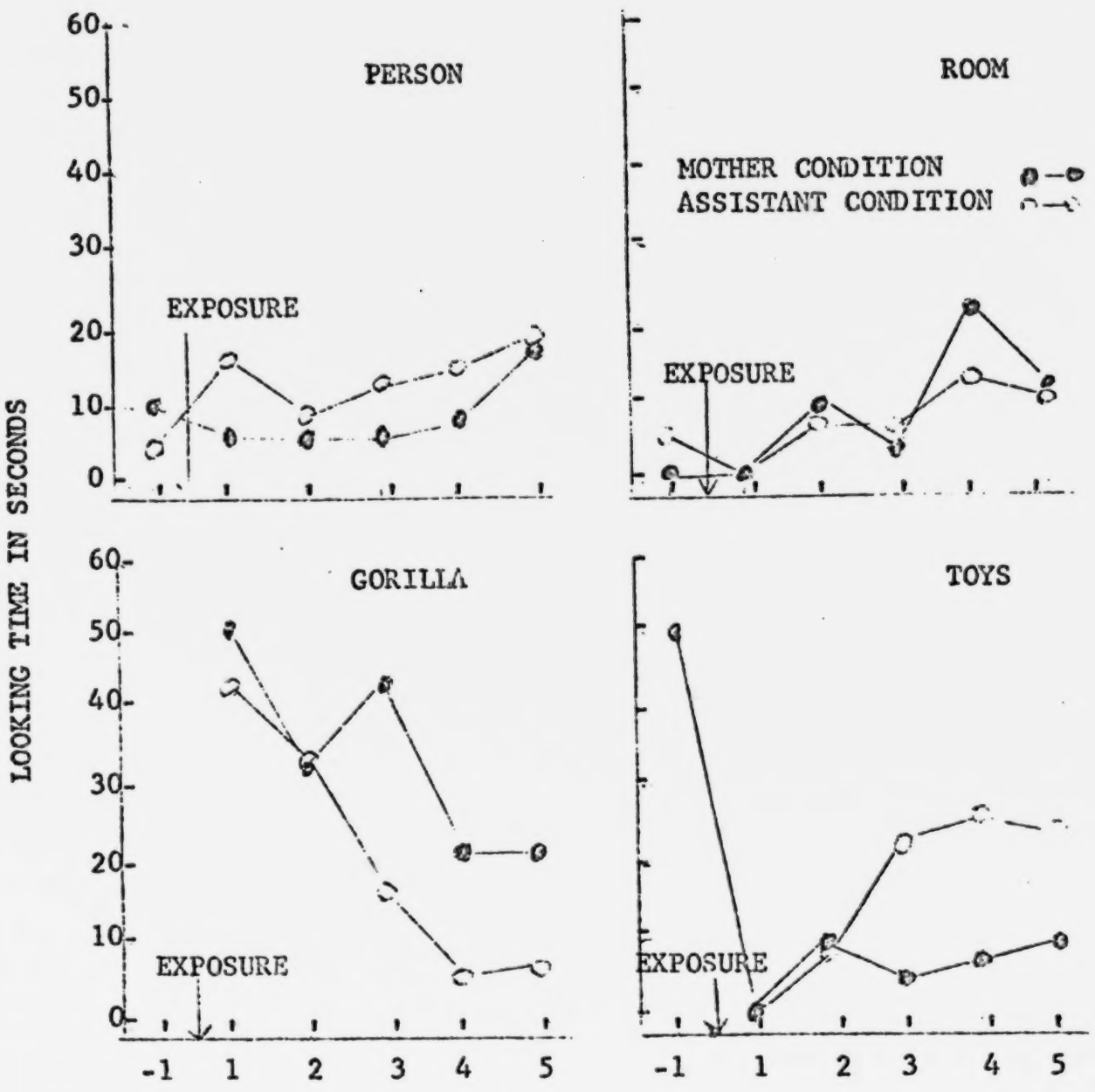
PERSON
ROOM
MOTHER CONDITION
ASSISTANT CONDITION
EXPOSURE
EXPOSURE
GORILLA
TOYS
EXPOSURE
EXPOSURE
60
50
40
30
20
10
0
-1
1
2
3
4
5
LOOKING TIME IN SECONDS
ONE MINUTE PERIODS

Table 1

Biserial correlations between Average Facial Expression for each minute of the Test Phase and the dichotomous classification of Return (N = 9) vs. Nonreturn (N = 7)

One Minute Periods					
-1	1	2	3	4	5
-.40	.73*	.83**	.64*	.58	.57

* p = .05 two-tailed test

** p = .01 two-tailed test

Table 2

Mean percentage of total time spent looking at four categories of objects during the 5 min. postexposure period by children in the Mother and Assistant Conditions

	GORILLA	TOYS	ADULT	OTHER
Mother Condition (N = 5)	57%	13%	14%	16%
Assistant Condition (N = 5)	36%	27%	24%	13%
p-value of the Mann-Whitney U	.08	.34	.11	.21